MUSINGS ON HUMAN EVOLUTION AND OTHER PAPERS

By Dr. Vissa Ramachandra Rao and V. Appa Rao (Junior)

Contents

1. Musings on Human Evolution by Dr. V.Ramachandra Rao

2. Beginnings of Man by Vissa Appa Rao

3.

Musings on Human Evolution

—Dr. V. Ramchandra Rao.

[In this paper the author takes a retrospect of the recent scientific findings on human evolution—Ed].

"It is sown a natural body. It is raised spiritual body." ST. PAUL

During the past score of years the whole picture of human evloution has dramatically changed and a completely new approach has taken its place. The evidence now suggests that man has evolved from *Homo habilis*; while numerous side branches developed away from the main stem and became over-specialised and eventually extinct (See Figure 1).

Earlier it was pronounced by leading anthropologists and anatomists that man's evolution has proceeded in "four successive stages", an ape or Pongid stage, followed by an *Australopitheline* or nearman stage, followed in-turn by a *Pithecanthropine* or primitive man stage, and finally *Homo sapiens*. In conjunction with Professor Wilfred Le Gros Clark, of Oxford, Dr. L.S.B. Leakey of Nairobi (1951) published a monograph *The Fossil Hominoidea of East Africa*, wherein was shown that forms of primate ancestral to the Far Eastern gibbons, known as *Limnopithecus* had been present during early Miocene times (35 to 15 million years before the present) in East Africa. Contemporary with them, there had existed numerous examples of a primate genus called *Proconsul* which possessed a number of characters that were more suggestive of human than ape stock. They suggested that the genus *Proconsul* might, perhaps, represent the common ancestor of the great apes and man.

In the fifties an examination of the numerous European remains of the *Neanderthal* man showed that his low cranial vault and massive brow ridges should be regarded as representing an over-specialisation away from *Homo sapiens*. The discovery of a fossil hominid skull by Dr. Louis, Leakey and Mary Leakey (at Olduvai) in Tanzania, (1959) which they called *Zinjanthropus*, along with the find of numerous primitive stone tools as well as animal bones that had been broken open to extract marrow and brains, was quite significant. These evidences fitted to satisfy the prevailing accepted definition of "man" as "that stage of primitive evolution when creatures begin to make tools to a set and regular pattern". In the absence of any evidence of a second type of hominid at Olduvai in East Africa, the Leakeys postulated that **Zinjanthropus* had been a tool making hominid and could be regarded

1. zinj was about 1.8 million yrs old-the first hominid fossil in the world to have a reliable age accorded to it.

Reprinted from* 'Archana' *Proceedings of the Birth Centenary of Prof. Vissa Appa Rao, 1984.

as a "man" by definition, although morphologically he was considered to be an *Australopithecine.*

The theory was short lived as the Leakey family (Dr. L.S.B. Leakey, Mary Leakey & Richard Leakey) discovered the remains of another and much more man-like type of hominid at Olduvai. With the find of further remains of several other representatives of the second type of hominid and in association with Dr. Napier of London and Professor Tobias of Johannesburg they announced (in 1960) that these fossils represented a new species of the genus *Homo habilis.* After some stormy controversy, today the status of *Homo habilis* is widely accepted and the *Australopithecines* had to be clearly regarded rather as a side branch and one that was evolving independently away from the stock leading to man.

The fossil skull fragments found in 1961 at Yayo, in the Chad Republic, can also be broadly included in the transitional group representing *Homo habilis* observed as an evolutionary transition between late piliocene-early Pleistocene (2 to 1 million years B.P.) hominid *Australopithecus* and middle Pleistocene (500,000 years B.P.) homonid.

Homo erectus

The Siwalik hills of North-western India and adjacent Pakistan have been known to Paleo-anthropologists[1] since the first half of 19th century for their fossil-rich finds of the Miocene (35 million years B.P.) and *Pliocene* (15 million years B.P.) age. It was from these strata that G.E. Pilgrim (1915) uncovered and named *Sivapithecus.* Later, G. Edward Lewis, a Yale zoologist, collected fossils for the Yale-Cambridge North India Expedition of the 1930's from these same beds and discovered a number of primate jaw fragments and teeth. In due course, they were assigned to several separate primate genera, including some additional examples of Pilgrim's *Sivapithecus.* Recent examination of *Sivapithecus* specimens suggests that they are not markedly different from *Dryopithecus.*[2] Like *Proconsul*, they may well deserve nothing more than subgeneric status amongst the cosmopolitan Dryopithecines. This would mean that not only Africa and Eurasia but India also supported separate populations of a single hominoid genus during Miocene and the earliest of Pliocene times-a span of at least 15 million years.

Another of the fossil primates Edward Lewis (1934) collected in the Siwalik Hills was *Ramapithecus.* The type species of *Ramapithecus* is founded on a portion of right upper jaw and is named *Ramapithecus brevirostris.* The fossil includes the first two molars, both premolars, the socket of the canine tooth, the root of the lateral incisor and the socket of central incisor. When this and other fossils of *Ramapithecus* are used to reconstruct an entire upper jaw, complete with palate, the result is surprisingly human in appearance.

This led Lewis in 1934 to suggest that *Ramapithecus* might well belong to Hominidae. Elwin L. Simons (1964) strongly upholds the view in the wake of Leakey's recovery in 1962 of the jaws of a similar hominid near Fort Ternan in South West Kenya.

1. Scientists who study the fossilized ancient life forms of human beings.
2. Dryppithecus is African fossil ape belonging to the Dryopithecinae group among which are to be found the various forms of ancestors of all the modern large apes, or atleast close relatives of these ancestors.

Leakey has assigned this fossil to the *Kenyapithecus wickeri*. Like the remains of *Ramapithecus brevirostris* it preserves much of the upper dentition. Potassium-argon dating of the specimen yields an *absolute* age of 14 million years, a time near the boundary between the Micocene and the Plicocene.

The Leakey family places *Kenyapithecus* in two species, *Kenyapithecus wickeri*, and *Kenyapithecus africanus* (1966-67) from Rosinga Island in Lake Victoria and Songhor, also in Kenya, dating back 20 million years. The characteristics of Kenyapithecus strongly suggest that it was an ancestor of man. The significance of this find lies in the fact that *Kenyapithecus* not only has an abundance of close anatomical links with *Ramapithecus* but also exhibits no permanent differences. In this new specimen, occurring in a continent removed in space from *Ramapithecus* are found the same for eshortened face, dental curve, and small canine tooth-each a hominid trait. "The conclusion is now almost inescapable; in *late Miocene to early Pliocene times* (about 15,000,000 yrs B.P.) *both* in Africa and in India, an advanced hominid species was differentiating from more conservative pongid stock and developing important hominid characteristics in the process. Pending additional discoveries it may be wiser not to insist that the transition from ape to man is now being documented from the fossil record, but this certainly seems to be a very strong possibility" (E.L. Simons, 1964).

The evidence today suggests that man, as we know him, was evolved from *Homo habilis*, while numerous side branches developed away from the main stem and became over-specialised and eventually extinct. A vast amount of work remains to be done before the whole story can be pieced together, but it is reasonably certain that both the *Australopithecines* and *Pithecanthropines* represent no more than side branches and not ancestral stock to *Homo sapiens*. The various morphological characters that are typical of these side branches represent over-specialisation and primitive characters. In addition, with the evidence that *Hominidae* existed some 20 million years ago, we now realise that those anatomical features in which the great apes resemble man are the result of parallel development rather than close genetic affinity.

The definition of man as a maker of "tools to a set and regular pattern" had to be abandoned a few years ago "because Jane Goodall (as quoted by Louis Leakey), who had been studying wild chimpanzees in their normal habitat, established that these distant cousins of man regularly make a variety of simple tools, albeit of perishable materials", and subsequently, in 1968 with Louis Leakey himself announcing the further discovery, at Fort Ternan, "of clear evidence that the *Hominid Kenyapithecus wickeri* had been using angular stones to batter bones and skulls of contemporary and now extinct animals to get at their brains and marrow."

"This early purposeful use of stones suggests that it would not have been long before flakes were deliberately knocked from a lump of rock. Since we know that at Olduvai *Homo habilis* made and used a variety of primitive tools nearly two million years ago, we may confidently expect that when we discover the Pliocene representative ancestral to *Homo-habilis* we find that he, too, had begun to make use of simple tools." (Leakey, 1970).

Human relics in Lake Rudolf.

Richard Leakey of the Leakey family found a skull in Lake Rudolf in Northern

Kenya 5 years ago which is believed to be 2.6 million years old and claimed to be the oldest human relic. It was also suggestive that man and ape-like primate developed side by side from a common ancestor much farther back in time. Leakey expects that "Some day will be discovered a link between *Homo* (man) and the *Australopithecine* and their ancestors in Africa about 4 to 5 million years ago."

It is reported recently (CGLO, 1974) that an American-French archaelogical team led by Dr. Donald C. Johanson of the Cleveland Museum of Natural History and Dr. Maurice Taieb of French Scientific Research centre, working in Ethiopia have uncovered a complete upper jaw with all the teeth in place, a half upper jaw and a half lower jaw, both with teeth from a semi-desert area in Awash Valley in Wollo province. They claim to be between three and four million years old and to represent the most complete remains of genus *Homo* from anywhere in the world at a very ancient time. When the dating of the specimen proves correct the discoveries would be almost 1.5 million years older than those previously discovered in the shores of Lake Rudolf in Kenya by Richard Leakey. Mr. Leakey maintains that Africa was the cradle of man.

Again at the end of 1974 Donald Johanson picked at Hadar in Awash valley, about 240 kilometres from Addis Ababa, several pieces of bone representing about 40% of the skeleton of a single individual. He named the fossil LUCY-a female as deduced from the complete pelvic bone of one side, and the sacrum available. 107 centimetres tall, and fully grown. That could be deduced from her wisdom teeth which were fully erupted and had been exposed to several years of wear. It was estimated that Lucy was 3.5 million years old. Further in 1975 more hominid fossils-a family of at least 13 individuals, men, women and at least four children, were discovered at Hadar by Johanson. He along with Tim White, an American Paleontologist, who worked with Richard Leakey at Laetoli, found that many of Leakey's Laetoli specimens of Hominids estimated at 3.75 million years old-800,000 years older than Hadar and 1,600 kilometres from Hadar were exactly like the older specimens (jaws) of Hadar. Later in 1979 a revised date was declared by Geologist James Aranson for the Hadar specimens as 3.75 million years old ± 100,000 years, which removes the difference of years between the two.

Based on the clear and consistent differences in the teeth of apes and human as listed by Le Gros Clark (1950), Johanson and Tim concluded that the Laetoli and Hadar individuals were distinct from apes and any of the later hominids. Also they made it clear that the specimens represent a common ancestor to the late Australopithecines and to Homo and that the divergence between the later two types probably began around 3 million years ago and that Africanus represents an intermediate stage on the way to Robustus, and that the Africanus was not ancestral to humans. They state, "We believe that the emergence of human beings began some time after 3 million years ago. By two million it had been accomplished. By then creatures recognisable as Homo walked on earth. So did their cousins, the Robust Australopithecines. For about a million years they appear to have walked side by side. By one million years ago there were no australopithecines left. They had all become extinct". And they gave the name Australopithecine Afareneis, to the Laetoli-Hadar Hominids and published their

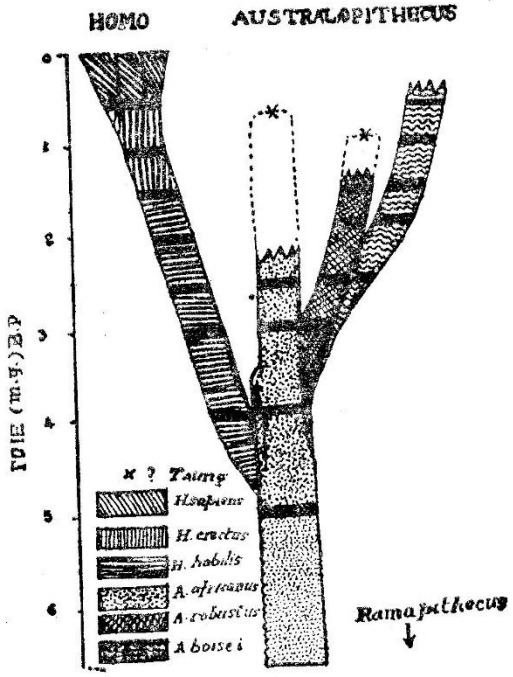
discovery in their paper in SCIENCE in May, 1975.

This raked up a stiff controversy. Prehistorian Dr. Randall Susman's argument is that Lucy was closer to the ape, a tree dweller to escape from predators of her time, and that sections of her skeleton prove that she was as awkward on her two feet as chimpanzee. If this reasoning prevails it would put bipedality and the first appearance of humanness in the evolutionary chain much later, may be even 1.5 million years later, than the date suggested by Johanson and Tim.

The Leakeys do not accept the identity of their Leotoli and other finds in the Lake Turkana region to Hadar fossils, but believe that the "true man" descended from a different hominid at the same time as Lucy, and that Lucy's own branch of the family tree withered and died.

Johanson notes that the geologists will be taking a crack at the 4-million-to-7-million-year-old deposits in the Afar, about 160 kilometres from Hadar, and hopes: "that what would be found in them could well blow the roof of everything, because science has not known, and does not know today, just how or when the all-important transition from ape to hominid took place."

The provisional phylogenetic tree of the hominidae is given in the Fig. 1. which



takes into consideration the Awash Valley finding and is a modification after the 1973 picture of Tobias. Fig. 2 indicates the phylogenetic relations of anthropoids and other primates.

References and guide for further reading :

Appa Rao, V. 1960. Beginnings of Man, Andhra University Colleges Chronicle, Waltair.

Donald C. Johanson & Maitland A. Edey 1981. Lucy-The Beginnings of Human Kind, Simon & Schuster Inc., New York.

"In the News", 1983. "The (other) Lucy Story. The Hindu, 29 May, 1983.

Le Gros Clark and Leakey L.S.B. 1951. The Fossil Hominoidea of East Africa A Monograph.

Leakey, L.S.B. 1970. The Evolution of Man. Abbottempo, Book I, Abbott Universal Ltd, Amsterdam.

Celo News Letter, 1974. Fossils Put Man At Four Million Years Old. C.G.L.O. 74. N. L. 12. Commonwealth Geological Liaison Office, Africa House, Kingsway, LONDON.

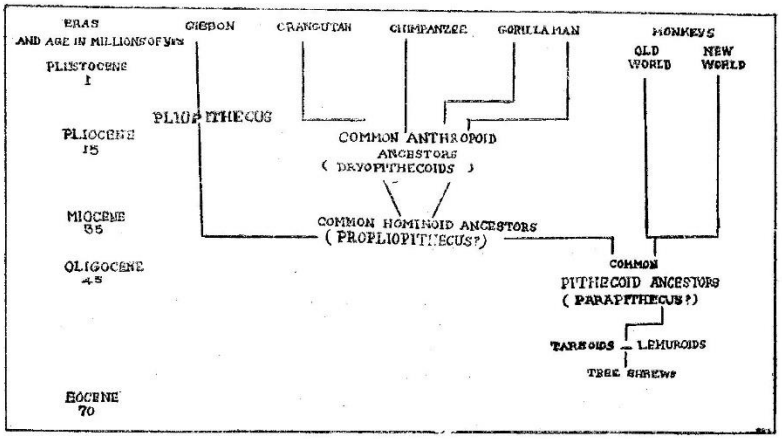
Pilgrim, 1915. New-Sivalik primates and their Bearing on the question of the Evolution Man and the Anthropoidea Rec. Geol. Surv. Vol. 45.

Robinson J.T., 1971. Fossil Evidence for Human Evolution. Topics in the Study of Life. The Bio Source Book, Harper & Row, Publishers Inc. New York.

Simons Elwyn L. 1964. The Early Relatives of Man. The Scientific American, Vol. 1.

Tobias, Philip V. 1973. Implications of the New Age Estimates of the Early South African Hominids. Nature, Vol. 246.

Weidenrich F. 1948. The Human Brain in the Light of its Phylogenetic Development. Scientific Monthly, Vol. 67.



Beginnings of Man

By

VISSA APPA RAO (Junior)*

"The study of the Beginnings of Man is the most fascinating of all branches of geology." *Capt. L. Munn.*

The study of the 'Beginnings of Man' is based on various kinds of facts. Some of them relate to man as a physical being: they are questions of species and human races. Others are concerned with man from the intellectual and moral point of view, the development of his knowledge, industry, social organization and so forth. Others again relate to his environment. The climatic conditions, fauna and flora, in which he lived, and which determined his activities and influenced his development.

I

The beginning of man is supposed to be in the early part of the Pleistocene period of the Quarternary Era. The Quarternary Era consists of two main divisions, the Pleistocene, or the Great Ice Age, and the Holocene or the Post-Glacial Age, in which we are now living. The duration of quarternary is one million years of which the last ten thousand years is the holocene.

Environmental conditions:

The environmental conditions in which man has originated and evolved are very different from those of today. During the Pleistocene period, ice sheets and glaciers developed in the north of Europe, in the Atlantic and in the high mountain regions such as the Himalayas and the Alps. From time to time warmer conditions returned and the ice was reduced in extent. The Pleistocene is divided into four glacial and three inter-glacial periods; the duration of the first, second and third inter-glacial periods being 60,000, 200,000 and 60,000 years respectively.

The prolific mammalian fauna of the Upper Tertiary suffered greviously with the oncoming of the ice age, for these highly specialised organisms were not fitted to withstand the extreme cold. Many of these species and genera died off while some managed to escape to warmer tropical regions and exist there.

From Andhra University Colleges Magazine & Chronicle 1959-1960.

The chronology of the Pleistocene is given in the table below:

TABLE 1
PLEISTOCENE CORRELATION

Age	Culture	Climate	W. Europe	India
Recent	Present Chalcolithic	Warming up	...	Newer alluvium
Holocene	Neolithic, Mesolithic	Fluctuating	Monasterian (Flandrian)	Older alluvium
Upper Pleistocene	Upper Palaeolithic; Mousterian, Levalloisian	IV Glacial	Wurm	Potwarloess and silts
		III Inter-glacial	Tyrrhenian	
Middle Pleistocene	Clactonian, Acheulian	III Glacial	Riss	Namada alluvium
		II Inter-glacial	Milazzan	
	Abbevillian or, Chellian	II Glacial	Mindel	Up. Boulder conglomerate
		I Inter-glacial	Sicilian	Lower Boulder conglomerate
Lower Pleistocene		I Glacial	Gunz Villa-Franchian	Bain, Boulder Bed, Pinjor

The climatic stimulus of this changing environment may well lead to man's evolution and differentiation into varied races as we will see later in the study.*

II

Evidences for the Evolutionary Origin of Man:

One hundred years ago the view that man had evolved from lower animals was held by very few people; today it is widely accepted. In 1809 Lamark stated his opinion that man descended from apes, but his revolutionary idea did not take root until the publication of Darwin's *Origin of Species* in 1859. There the author (Dar-

* It is interesting here to see that Narayan Bhavan Rao Pavgee suggests that the three interglacial climatic periods may be the Treta, Dwapara and Krita Mahayugas of our Vedic literature, and that the four glacial periods can be the pralayas or periods of catastrophism in which most of the living beings die out, which periods preceed the Mahayugas. According to the present day scientific thought there is strong evidence to believe that the age in which we are now living is another interglacial period which corresponds with the Kali Yuga of the Vedic literature! (*Vedic Fathers of Geology*, by Narayan Bahvan Rao Pavgee. Poona, 1912.)

win) showed that his theory of evolution would throw light on the origin of man, and he developed this theme more fully in his *Descent of Man,* published in 1871.

"If there has been no fossil evidence what-so-ever, it still would be perfectly possible to establish with reasonable certainty that man is the highest product of evolutionary emergence, that he is so similar to the living apes and monkeys in such a multitude of specific traits that he is a mammal and has a common ancestry with other vertebrates." (Hoebel, 1958). At the present day the evolution of man has come to be regarded as a fact rather than theory by all persons qualified to judge the relevant evidence.

The five major kinds of evidence that form the basis for these conclusions are: (1) comparative morphology, (2) vestigial remains, (3) embryological ontogeny, (4) comparative blood relationships, and (5) transitional fossils.

(1) *Comparative morphology*: Every bone that is present in the apes is also ordinarily present in man. The dissimilarities exist in the shapes of various bones. The same holds generally true for the musculature and the internal organs. Bones and tissues in man and ape are alike in number and usually in function they differ slightly in form. In man these differences in form and function are associated primarily with the attainment of upright posture; greater stability and solidity of the hind limbs (hind arms), enlargement of the brain. reduction of the face and jaws, and differences in dentition. "No zoologist, unhampered by anthropocentric or theological preconceptions, would have the slightest hesitancy in classifying man with the apes and monkeys as a primate on the basis of comparative morphology alone". (Hoebel, 1958).

(2) *Vestigial remains*: These are organs that have no, or only a limitedly discernable function in the living creature, but which can be easily seen to have had a significant function in more primitive forms. An example: the coccyx, formed of the last four caudal vertebrae at the bottom of the spine, is a hidden vestigial tail, which is folded under, and does not show in most of us at birth. It is external in the human embryo during the second month of its coccyx showing. Other examples are: the presence and distribution of body hair on man, the vermiform appendix, the third molar or the wisdom tooth and the numerous muscles occurring in different parts of the body.

(3) *Recapitulation in embryological development*: "Ontogeny recapitulates Phylogeny". It has long been held that the human embryo recapitulates the evolutionary history of the human race. This is known as recapitulation theory. The human embryo passes through successive stages roughly similar to an undifferentiated cell mass, a coelenterate, a worm, and a generalised fish with the foundation of gill arches in its neck region; finally, it takes on mammalian qualities and is ultimately born a man-child.

(4) *Comparative blood-relationships*: Further evidence of relationship comes from serology. The serum precipitin test now even provides means of establishing degrees of blood relationship. Applied to the blood of primates it has confirmed the conclusion that man is related to the apes, and more distinctly to monkeys. Man and apes share some of the blood groups and are subject to many of the same diseases.

(5) *Transitional fossils*: The Lemurs, the Tarsiers, the Monkeys, the Apes and Man, all these form the order of Primates. As a matter of convenience, we shall follow here the most recent and authoritative scheme of classification put forward by Dr. G. G. Simson. According to this classification, the primates are divided into two suborders, the Prosimii and Anthropoidea. The latter includes Man, Anthropoid apes and Monkeys, and the former the Tarsiers, Lemurs and Treeshrews. The Anthropoidea are further sub-divided into three super families, Hominoidea, (including Man and Anthropoid apes), Cercopithecoidea (Old World monkeys), and Ceboidea (New World monkeys). The Hominoidea is subdivided into two families the Hominidae, which includes modern and extinct forms of Man, and the Pongidae, which includes the modern and extinct anthropoid apes.

The Primates were derived from small insect-eating mammals similar to the insectivores, whose fossil remains have been found in cretaceous rocks of North America. The living tree-shrews, closely related to insectivores and having a wide distribution in south-east Asia (in India there are representatives of them which have a superficial resemblance to the squirrels), represent a survival of the earliest type of Primate.

"The conclusion that Man is related to the Apes naturally implies that if their ancestries could be traced back far enough, they would be found to have diverged from the same stock; it does not imply that Man has evolved from apes such as exist today. Fossil remains of Primates are rare, but those which have been discovered support this deduction."

The earliest fossil primates are found in considerable numbers in the Eocene of Europe. The Lower Oligocene of Egyptian Fayum contains Parapithecus, which was connected with the Tarsiers, the Lemurs, and the Anthropoids. The same beds contain Propliopithecus, a small generalised anthropoid ape. According to the prevailing theory advanced by Thomas Henry Huxley, Darwin's protagonist, nearly a century ago, in 1863, among the fossil Old World apes, this may be the most nearly related to the common stock, whence sprang the four types of higher apes and Man. Of these, the gibbon stands somewhat apart, while the chimpanzee and the gorilla have diverged in some respects from their remote ancestor, which they shared with Man. Early gibbons and forms intermediate between chimpanzee and gorilla have been discovered in the orangutans (Dryopithecinae) of the Upper Sivalik Hills of India.

"There can be little doubt, indeed, that among the African fossil apes and the various forms of Dryopithecinae are to be found the ancestors of all the modern large apes, or at least close relatives of these ancestors. Although the fossil record is much too incomplete to allow of a positive statement, there is reason to suppose that this may actually be so. For example, the limb structures of some of these miocene apes was certainly more generalised than that of the present day apes, and may possibly have provided a basis for the human type as well as limbs of the type found in modern anthropoid apes. Again, the cusp pattern of the molar teeth of Dryopithecus has certain characteristic features which are not commonly found in modern Man, but which are certainly present in the teeth of fossil human types, from which it is believed Homosapiens may have been derived." (Le Gros Clark, 1958.)

The inferred phylogenetic relations of the Primates according to the Huxley hypothesis is shown in the figure below. (Fig. 1)

Recently the Huxley hypothesis has been challenged by William L. Straus (1949) and Marcelin Boule, according to whom (Boule-Straus Hypothesis) Man evolved from a proto-Old World Monkey form and not from the anthropoid ape. This hypothesis holds that the Hominoid branch developed before, and separately from that which produced the great apes. For the present we can only say that each hypothesis has a good deal to commend it, although the Huxley hypothesis has the fossil evidence, whereas the Straus hypothesis is based on morphological and ontogenetic evidences.

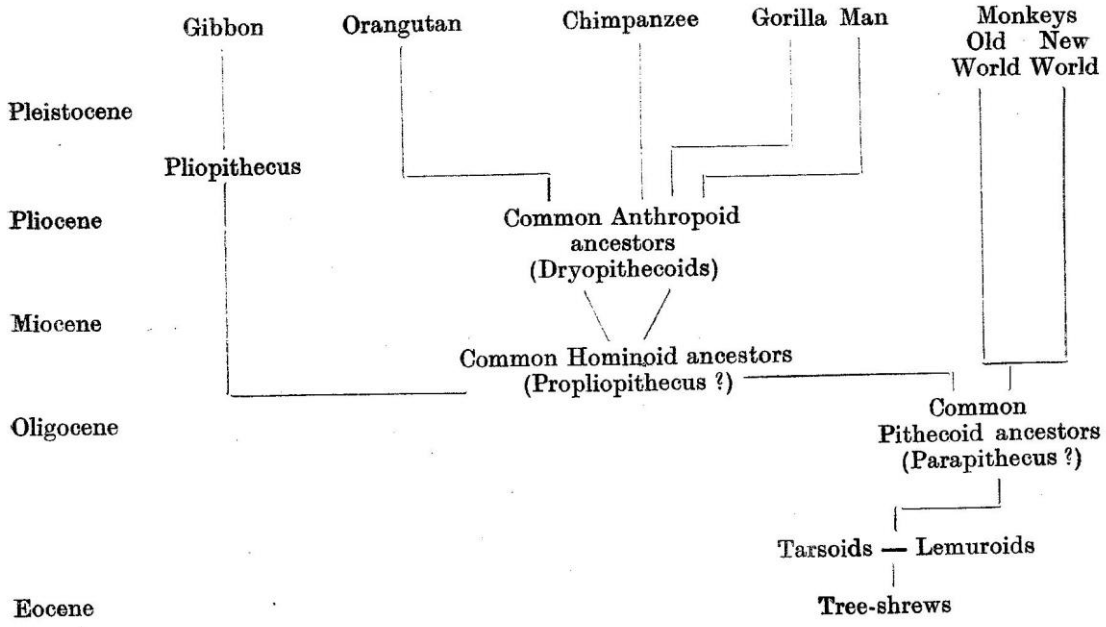
III

Evidences of Early Man :

Our knowledge of Man, apes and the early men of the dawn of human history is derived from two main sources. First, there is the evidence of the fossil remains, of which many new discoveries have been made during the last thirty years. Second, there is the evidence of the implements used by Man during his gradual progress towards culture and civilization.

The early Man's implements have been found in river gravels and cave deposits. The implements of early stages are known as the Paleoliths, and the period during which they were made is known as Paleolithic or Old Stone Age. At first the chipping of the implements was coarse and crude, and the edge of the implement was rough and irregular, but with advancing skill the edge was straightened by rechipping and trimming. A very great advance was made when it was discovered how to knock off long flakes with sharp knife like edges, with which pieces of bones could be cut into useful shapes. Some of these were sharp edges for boring holes and into sharp knife-like edges for carving. By this time Man has become an artist and sculptor of no mean merit. The drawings of these

Fig. 1



early stages are to be found in the famous caves of Cogul in Spain, and of later stages in the Singanpore caves of India. These differences mark off the Lower Palaeolithic from the Upper Palaeolithic.

Later still the art of smoothing the surface of the implements by rubbing them on stones was discovered. This ushered in the Neolithic or the New Stone Age. By this time Man had attained some degree of civilization, for he was now an agriculturist, and had tamed many of the domestic animals. Where exactly agriculture was first practised is not definitely known, but it may have been in Egypt or India. The early Man of Neolithic Age knew also the arts of weaving and pottery making.

Between the Neolithic and the Paleolithic, there is found to be a transition period characterised by the Microliths. Microliths are beautifully shaped small implements, and this transition period is known as the Mesolithic.

There is another culture complex known as Megalithic, characterised by the Megaliths. These Megaliths are monuments where rituals were held, or which constituted burial sites. They were invariably built of large stones, whence the name. There are various types of these known as the Dolemns, Topikals, Cists, Cairns and Burials. Many Megaliths have been discovered in Scandinavia, Britany, Southern England and India. In India the centre of this culture is the area represented by the Brahmagiri, Maski and Bellary.

The succession of the cultural phases is given below. (Fig. 2)

Fossil Evidence :

Fragmentary remains of Man himself have been discovered. In 1924, Raymond A. Dart discovered skulls of Australopithecus near Taungs in Rhodesia. Australopithecus was small, about four feet in height, with a brain scarcely exceeding in size of a gorilla, but with teeth of essen-

Fig. 2

Post Glacial	Recent	Atomic	— Age of Atomic Power.
		Iron, Bronze, Copper	— Age of Metals.
	Neolithic		Beginnings of agriculture, weaving and pottery making (Egypt, India, N. W. Asia).
Pleistocene or Glacial	Mesolithic		Microliths, Capsian Industry (Africa, Europe, India.)
	Upper Palaeolithic	Magdalenian, Solutrian, Aurignation	Cave drawings and bone implements.
	Lower Palaeolithic	Mousterian and Levalloisian	— Scrapers and Borers — Flakes.
		Acheulian & Clactonian, Abbevillian	Coups-de-poing or hand axes.

9

tially human type. Its backbone, hip-girdle, and limbs were of human form and proportions; it walks upright on two legs, and, unlike apes, was able to live away from forest in dry open country, as is shown from the fossil remains of other animals associated with it.

The earliest undoubted men were of the genus Pithecanthropus, known from Java and China. They were not only capable of tool-making but of extending their range beyond the tropics by the use of fire and rock shelters; they were hunters and man-eaters. These beginnings of culture were closely linked with expansion of the brain. The scattered fragments of the skeleton, including the top of the skull, isolated teeth, and a thigh bone of the Pithecanthropus were discovered near Trinil in Java by the Dutch Anatomist Dubois in 1892. He called it as Pithecanthropus erectus. In 1937 Prof. G. H. R. Von Koenigswald obtained more remains of this Java Man. Another fossil remains were found in 1927, near Choukoutein in China by Davidson Black of Canada. These fossils are named to be of Pithecanthropus Pekinensis, the 'ape-man of China'. The cranium of Java skulls ranges from 775 c.c. to 1,000 c.c. which compares with 450 c.c. to 700 c.c. for Australopithecus and 1,200 c.c. for primitive modern races and 1,600 c.c. for the modern European. The Pekin-Man is found by Franz Weidenreich to belong to the same genus of the Java-Man, and his brain capacity ranged from 1,000 c.c. to 1,300 c.c. These two species, Java-Man and Pekin-Man, are found to have lived between 500,000 and 200,000 years and 300,000 and 20,000 years ago respectively.

More recent remains have been found in Europe with later phases of the Lower Paleolithic cultures. These have certain common characteristics which distinguish them from all later men and are referred as Neanderthaloids, after the name of the site Neander in Germany, where the remains have been discovered for the first time. Two genus of the Neanderthaloid are described. One from Gibraltar, Dusseldorf (Germany), Le Moustier in the Dordogne localities of Europe, and the other other from Mount Carmel of Western Asia. These belonged to the Mousterian culture. In the Far East and in Africa there were similar types such as Solo Man of Java, Saldanha Man of South Africa, and Broken Hill (Rhodeshia) Man of Central Africa. All these men were of small stature and had prominent brow ridges and a sloping forehead pinched in at the sides behind the orbits. They exhibited an average brain capacity of 1,300 c.c. These men became extinct at the climax of the severe Fourth Glacial Period.

Other remains relating to Heidelburg, Steinheim and Swanscombe skulls have been described from Europe associated with Acheulian culture, and these are supposed to form 'Pre-Neanderthal' or 'Pre-Sapiens' group; but we have to wait for more information regarding them, before making any decision.

Every human race since the dawn of Upper Palaeolithic is ascribed without distinction of size or colour to the same species "Homo-Spaiens" or "Wise-Men". Chief among the fossil representatives of Homo-Sapiens are, the Cro-Magnon, the Chancelade, the Predmost and the Grimaldi men. These finely-built, tall races differed from the Neanderthalers, in having high domed skulls and refined facial features and being muscular, some time over six feet in height. It is also distinguished that

the Predmost type had larger brow ridges; the Grimaldi of Negroid appearance; and the Chancelade type with some resemblance to the Eskimo.

Anatomical Changes in the Evolution of Hominoids:

"Among the earliest Hominoids it was the spinal-chest-shoulder-forearm complex that first underwent marked modification through adaptation to brachiation. Then, as the ancestors of the Hominoids took habitually to the ground, the next great segment to be generally modified was the pelvic-lower limb complex. Modification of the jaw-face-cranial complex (particularly the great enlargement of the brain) came very late in the phylogeny of Man and Homo-Sapiens precursors. It is now held, with a sound basis of evidence, the complex of features related to the upright posture is the most important morphological characteristic of the Hominoid line and the preliminary condition for the later mental development that came to characterise the genus Homo" (Hoebel, 1958).

Evidences of Early Man in India:

"Not even a single fossil has been discovered in this vast continent which can be ascribed to a human race, more primitive than that of any living today" (Sahani, 1952). But, however, the existence of early man is revealed by a number of his implements preserved among the gravels of the Sohan and Indus rivers of the Potwar Plateau, and the Narbada, Godavari, Krishna and Kortalayar rivers of South India. The credit for discovering the first stone implements in India goes to Bruce Foot, who picked up the first Palaeoliths at Pallavaram (near Madras) in 1863. His discovery was followed by a host of other sites being found in other states of Bombay, Hyderabad, Punjab, Kashmir, etc.

On the surface of the Potwar Plateau have been found scores of sites containing numerous implements and described by de Terra. The implements are pebble tools and flakes of quartz mostly, and the industry is described as the Sohan Industry. There are three phases of this industry known as the Pre-Sohan, the Early Sohan (Lower Palaeolithic) and the Late Sohan (Upper Palaeolithic) phases. Near Vadamadurai in the river valley of Kortalayar a hand-axe industry has been described as the Madrasian Industry. This dates to the early Middle Pleistocene. Thus in India have been found two types of cultures of early man.

Did Man Exist Earlier than the Ice Age?

Implements called Eoliths have been described from many parts of Europe and Burma, found in the Upper Miocene to the Oligocene beds. These are regarded as the prototypes of Palaeoliths. This is denied by many scientists who believe them to be the result of natural forces and pressure. Moreover the flaking of Eoliths differ from the human flakes and these are not associated with any Palaeontological evidences. Apart from this there is no evidence to suggest the existence of Man earlier than the Ice Age. Scientists believe that Man is essentially a product of the Pleistocene climatic changes which provided the cause and the opportunities of his appearance.

IV

The Home Of Man:

The family tree of true man seems to have its root in Africa, where the great

man-like apes also went through the earliest stages of development. These creatures had probably migrated from Africa to Asia, where the first known forbears of Homo-Sapiens made their appearance. But there is no fossil evidence of intermediate form to suggest how they evolved. Then the main centre of human evolution shifted to Europe, where was first a primitive stock that was probably descended from thier African forefathers and then the modern species, Homo-Sapiens, which seem to have migrated westward during the climax of the Fourth Glacial period from some unidentified locality in Asia. It is interesting to know that this locality is supposed to be somewhere near the Siwaliks of India by Pilgrim (1915) who described for the first time the fossil Anthropoid apes from India, and lately by Prof. Charlesworth (1957), M. R. Sahani (1952) and others. According to them the centre of evolutionary radiation of the human family may be represented by the fossiliferous deposits of the Siwaliks. It is well known that the Siwalik deposits have yielded numerous important fossils of Primates as well as mammals of Tertiary period. To these belong the Siwapithecus, Palaeopithecus. Sivalensis and the Dryopithecus, of which the last is supposed to be the ancestor of the Hominidae.

It is astonishing that, except for a few fossils of the Homo-Sapiens race found at Adittanallur (Tinnelvelli district), Bayana (Agra), and Langhanhanj (Gujerat), and Sialkot and Nal of West Pakistan, there are no fossils of the early races of the Pleistocene in India. To prove that India is the "*Cradle of Human Race*" and to fill this gap of evolutionary history between Dryopithecus and Homo-Sapiens, extensive researches must be done in India.

One cannot close this note in a better way than by reprinting the appeal made by the great authority on pre-histories, Bruce Foot of the Geological Survey of India in 1901; this applies most forcefully even to the conditions of the present day. "...This is a want which will never be adequately remedied till a full and exhaustive prehistoric survey of the country is made by a really competent specialist, who should be a geologist and an osteologist, as well as a trained archaeologist, not a mere architectural surveyor. A knowledge of Sanskrit will be of no use in deciding as to the sources whence were derived the many foreign rocks and minerals found in the many old residential sites, which upto date have only had their surfaces examined.

"The urgency for the establishment of a genuine prehistoric survey is very great, if the study of this most fascinating branch of Archaeology is to be encouraged and the wanton destruction of prehistoric monuments checked. Such survey, if honestly carried out, would go far to produce much larger data than yet exist as to the distribution over the southern districts of the peninsula of the Palaeolithic people whose remains in the shape of chipped implements have been found in so many localities in the Karnatic and on the Deccan plateau embedded in Pleistocene deposits. Such data might help materially and to bridge over the great hiatus in time, which now appears to exist between the Era of those very rude people and that of the neolithic tribes who followed them in the same country. Further research in the Southern districts especially might result in the finding of evidence as to the quarter from which the Dravidian tribes entered the Peninsula, a question of very high ethnological interest".

For Further Reading Please See **The Goal of Bhrukta Rahita Taraka Raja Yoga - Eradication of Karmic Effects and Establishment of Eternity.pdf (archive.org)**

This Publication Contains References to ***"Biological Evolution and Human Evolution" in Relation to "Evolution of Earth and Plate Tectonics"***

the Predmost type had larger brow ridges; the Grimaldi of Negroid appearance; and the Chancelade type with some resemblance to the Eskimo.

Anatomical Changes in the Evolution of Hominoids :

"Among the earliest Hominoids it was the spinal-chest-shoulder-forearm complex that first underwent marked modification through adaptation to brachiation. Then, as the ancestors of the Hominoids took habitually to the ground, the next great segment to be generally modified was the pelvic-lower limb complex. Modification of the jaw-face-cranial complex (particularly the great enlargement of the brain) came very late in the phylogeny of Man and Homo-Sapiens precursors. It is now held, with a sound basis of evidence, the complex of features related to the upright posture is the most important morphological characteristic of the Hominoid line and the preliminary condition for the later mental development that came to characterise the genus Homo" (Hoebel, 1958).

Evidences of Early Man in India :

"Not even a single fossil has been discovered in this vast continent which can be ascribed to a human race, more primitive than that of any living today" (Sahani, 1952). But, however, the existence of early man is revealed by a number of his implements preserved among the gravels of the Sohan and Indus rivers of the Potwar Plateau, and the Narbada, Godavari, Krishna and Kortalayar rivers of South India. The credit for discovering the first stone implements in India goes to Bruce Foot, who picked up the first Palaeoliths at Pallavaram (near Madras) in 1863. His discovery was followed by a host of other sites being found in other states of Bombay, Hyderabad, Punjab, Kashmir, etc.

On the surface of the Potwar Plateau have been found scores of sites containing numerous implements and described by de Terra. The implements are pebble tools and flakes of quartz mostly, and the industry is described as the Sohan Industry. There are three phases of this industry known as the Pre-Sohan, the Early Sohan (Lower Palaeolithic) and the Late Sohan (Upper Palaeolithic) phases. Near Vadamadurai in the river valley of Kortalayar a hand-axe industry has been described as the Madrasian Industry. This dates to the early Middle Pleistocene. Thus in India have been found two types of cultures of early man.

Did Man Exist Earlier than the Ice Age?

Implements called Eoliths have been described from many parts of Europe and Burma, found in the Upper Miocene to the Oligocene beds. These are regarded as the prototypes of Palaeoliths. This is denied by many scientists who believe them to be the result of natural forces and pressure. Moreover the flaking of Eoliths differ from the human flakes and these are not associated with any Palaeontological evidences. Apart from this there is no evidence to suggest the existence of Man earlier than the Ice Age. Scientists believe that Man is essentially a product of the Pleistocene climatic changes which provided the cause and the opportunities of his appearance.

IV

The Home Of Man :

The family tree of true man seems to have its root in Africa, where the great

Please Read Pages 10 and 11

In the place of original pages 8 and 9 for clear Reading.

Leakey has assigned this fossil to the *Kenyapithecus wickeri*. Like the remains of *Ramapithecus brevirostris* it preserves much of the upper dentition. Potassium-argon dating of the specimen yields an *absolute* age of 14 million years, a time near the boundary between the Micocene and the Plicocene.

The Leakey family places *Kenyapithecus* in two species, *Kenyapithecus wickeri*, and *Kenyapithecus africanus* (1966-67) from Rosinga Island in Lake Victoria and Songhor, also in Kenya, dating back 20 million years. The characteristics of Kenyapithecus strongly suggest that it was an ancestor of man. The significance of this find lies in the fact that *Kenyapithecus* not only has an abundance of close anatomical links with *Ramapithecus* but also exhibits no permanent differences. In this new specimen, occurring in a continent removed in space from *Ramapithecus* are found the same for eshortened face, dental curve, and small canine tooth-each a hominid trait. "The conclusion is now almost inescapable; in *late Miocene to early Pliocene times* (about 15,000,000 yrs B.P.) *both* in Africa and in India, an advanced hominid species was differentiating from more conservative pongid stock and developing important hominid characteristics in the process. Pending additional discoveries it may be wiser not to insist that the transition from ape to man is now being documented from the fossil record, but this certainly seems to be a very strong possibility" (E.L. Simons, 1964).

The evidence today suggests that man, as we know him, was evolved from *Homo habilis*, while numerous side branches developed away from the main stem and became over-specialised and eventually extinct. A vast amount of work remains to be done before the whole story can be pieced together, but it is reasonably certain that both the *Australopithecines* and *Pithecanthropines* represent no more than side branches and not ancestral stock to *Homo sapiens*. The various morphological characters that are typical of these side branches represent over-specialisation and primitive characters. In addition, with the evidence that *Hominidae* existed some 20 million years ago, we now realise that those anatomical features in which the great apes resemble man are the result of parallel development rather than close genetic affinity.

The definition of man as a maker of "tools to a set and regular pattern" had to be abandoned a few years ago "because Jane Goodall (as quoted by Louis Leakey), who had been studying wild chimpanzees in their normal habitat, established that these distant cousins of man regularly make a variety of simple tools, albeit of perishable materials", and subsequently, in 1968 with Louis Leakey himself announcing the further discovery, at Fort Ternan, "of clear evidence that the *Hominid Kenyapithecus wickeri* had been using angular stones to batter bones and skulls of contemporary and now extinct animals to get at their brains and marrow."

"This early purposeful use of stones suggests that it would not have been long before flakes were deliberately knocked from a lump of rock. Since we know that at Olduvai *Homo habilis* made and used a variety of primitive tools nearly two million years ago, we may confidently expect that when we discover the Pliocene representative ancestral to *Homo-habilis* we find that he, too, had begun to make use of simple tools." (Leakey, 1970).

Human relics in Lake Rudolf.

Richard Leakey of the Leakey family found a skull in Lake Rudolf in Northern